

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte JONG J. PARK and HYUN H. SHIN

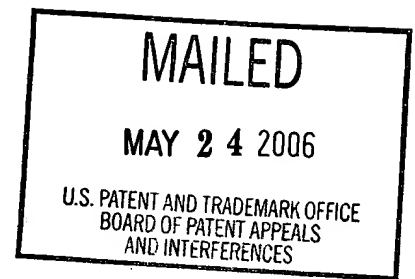
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Appeal No. 2006-1726  
Application No. 09/725,849

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ON BRIEF

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Before JERRY SMITH, BLANKENSHIP, and HOMERE, Administrative Patent Judges.

HOMERE, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal from the final rejection of claims 1-8, 11-14, 16 and 18, all of which are pending in this application. Claims 9 and 10 have been allowed. Claims 15, 17, and 19-21 have been canceled by Appellants.

***Invention***

Appellants' invention relates generally to a method, and an apparatus for driving a liquid crystal display (figure 9), which includes a liquid crystal display panel (22) having liquid crystal pixel cells being driven by thin film transistors. The liquid crystal pixel cells are arranged in a matrix type at each intersection of a plurality of gate lines (GL1...GLm) originating from a gate driver (26) and a plurality of data lines (DL1...DLm) originating from a data driver (24). The gate driver (26) issues gate pulses via the gate lines to drive the thin film transistors, which in turn, drive the liquid crystal pixel cells in accordance with the signal provided in the data lines. During the beginning of a frame, the gate driver (26) issues a gate pulse via the gate lines to charge the liquid crystal pixels in accordance with a "pixel on" signal issued by the data driver (24) via the data lines. During the ending of the frame, the gate driver (26) issues another gate pulse via the gate lines to discharge the liquid crystal pixel cells in accordance with a "pixel off" signal issued by data driver (24) via the data lines. See Appellants' specification, page 8, line 24-page 9, line 7. See also page 7, line 28- page 8, line 7.

Claim 1 is representative of the claimed invention and is reproduced as follows:

A method of driving a liquid crystal display having liquid crystal pixel cells arranged at each intersection between a plurality of gate lines and a plurality of data lines in a matrix type and being driven with thin film transistors, said method comprising:

applying a first signal to the liquid crystal pixel cells through said data lines for charging thereof during a beginning of a frame; and

applying a second signal different from said first signal to the liquid crystal pixel cells through said data lines for discharging thereof during an ending of the frame.

#### **References**

The Examiner relies on the following references:

Miwa et al. (Miwa)	6,396,469	May 28, 2002
Takahashi	6,297,792	Oct 2, 2001
Kubota et al. (Kubota)	5,907,313	May 25, 1999

#### **Rejections At Issue**

- A. Claims 1, 4-5, 8, 11-14 and 16 stand rejected under 35 U.S.C. § 102 as being anticipated by Takahashi.
- B. Claims 2, 3, 6 and 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Takahashi and Miwa.
- C. Claim 18 stands rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Takahashi and Kubota.

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Rather than reiterating the arguments of Appellants and the Examiner, the opinion refers to respective details in the Briefs<sup>1</sup> and the Examiner's Answer<sup>2</sup>. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants could have made but choose not to make in the Briefs have not been taken into consideration. See 37 CFR 41.37(c)(1)(vii)(eff. Sept. 13, 2004).

#### OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the Examiner's rejections, the arguments in support of the rejections and the evidence of anticipation and obviousness relied upon by the Examiner as support for the rejections. We have likewise reviewed and taken into consideration Appellants' arguments set forth in the Briefs along with the Examiner's rationale in support of the rejections and arguments in the rebuttal set forth in the Examiner's Answer.

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<sup>1</sup> Appellants filed an Appeal Brief on June 14, 2004. Appellants filed a Reply Brief on December 02, 2005.

<sup>2</sup> The Examiner mailed an Examiner's Answer on October 06, 2005. Examiner mailed an office communication on March 07, 2006, stating that the Reply Brief has been entered and considered.

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It is our view, after full consideration of the record before us, that we agree with Appellants that claims 1, 4, 5, 8, 11-14 and 16 are not properly rejected under 35 U.S.C. § 102 as being anticipated by Takahashi. We further agree with Appellants that claims 2, 3, 6 and 7 are not properly rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Takahashi and Miwa. Additionally, we agree with Appellants that claim 18 is not properly rejected as being unpatentable over the combination of Takahashi and Kubota. Accordingly, we reverse the Examiner's rejections of claims 1-8, 11-14, 16 and 18 for the reasons set forth **infra**.

Appellants have indicated that for purposes of this appeal the claims stand or fall together in eight groups. See page 4 of the Appeal Brief. However, the reasons set forth **infra** are applicable to all the claims. Therefore, we will consider Appellants' claims as standing or falling together, and we will consider claim 1 as being representative of the claimed invention.

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**I. Under 35 USC 102(e), is the Rejection of Claims 1, 4, 5, 8, 11-14 and 16 as Being Anticipated By Takahashi Proper?**

It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim. **See In re King**, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and **Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.**, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

With respect to the Takahashi reference, Appellants argue at page 7 of the Appeal Brief that Takahashi does not disclose that "the first signal is applied during the beginning of the frame and the second signal is applied during the ending of the frame."

To determine whether claim 1 is anticipated, we must first determine the scope of the claim. We note that claim 1 reads in part as follows:

"applying a first signal to the liquid crystal pixel cells through said data lines for charging thereof during a beginning of a frame; and applying a second signal different from said first signal to the liquid crystal pixel cells through said data lines for discharging thereof during an ending frame."

At page 7, line 28 through page 8, line 22, Appellants' specification states:

As shown in Fig. 7, the liquid crystal pixel cells are charged by a video data signal when the gate pulse GP is applied to the TFT and a channel of the TFT is formed. After the gate pulse is turned off, the liquid crystal pixel cells maintain the charged video data signal. When the gate pulse GP is again applied to the TFTs during the duration of the frame, e.g., at the mid-point of the frame, the TFTs are driven and the liquid crystal pixel cells perform a discharge due to an off-voltage applied on the data lines. After the gate pulse GP is again turned off, the liquid crystal pixel cells maintain a ground voltage.

Thus, the liquid crystal pixel cells have an increasing transmittance  $T$  during the beginning half interval of each frame charged by the video data  $V_{data}$  as shown in Fig. 8 in a normally black mode to transmit a light inputted from a backlight unit, and have a decreasing transmittance  $T$  during the ending half interval of each frame to shut off the incident light. As a result, since each of the liquid crystal pixel cells is completely discharged before the end of each frame, a residual image does not appear in the next frame by the video data maintained in the previous frame. In other words, the liquid crystal pixel cells are turned on and off in approximately a half period of each frame.

Thus, the claim does require that a first signal be applied to the crystal pixel cells for charging thereof during the beginning of a frame and applying a second signal to the pixel cells for discharging thereof during the ending of the frame.

Now the question before us is what Takahashi would have taught to one of ordinary skill in the art? To answer this question, we find the following facts:

1. Takahashi states at column 14, lines 9 through 34 that:

Each scanning signal supplied from the scanning signal drive circuit 100 has a first selecting voltage which is set to VS1 in the charging mode, and which is supplied to one of the scanning lines Y1 to Ym in a charging period Tcc corresponding to the second half  $1/2H$  of one horizontal period H. Tccj and Tccj-1 written in FIGS. 8(B) and 8(C) respectively denote the charging periods in the charging modes with respect to the scanning signals supplied to the scanning lines Yj and Yj-1.

On the other hand, in the scanning signal in the discharging mode a precharge voltage in an overcharging period Tdc is set to -VPRE, which is opposite in polarity to the first selecting voltage (VS1) about the middle value of data signals, and a second selecting voltage in a discharging period Td, output successively, is set to VS2 having the same polarity as VS1 about the middle value of data signals and smaller in absolute value than VS1. The overcharging period Tdc of supply to each of the scanning signals Y1 to Ym is set as the first half  $1/2 H$  of one horizontal period H while the discharging period Td of supply to each of the scanning signals Y1 to Ym is set as the second half  $1/2$  of the one horizontal period H. Tdcj, Tdj, Tdci-1, and Tdj-1 written in FIGS. 8(B), 8(C), and 8(D) respectively denote the overcharging and discharging periods in the discharging modes of the scanning signals supplied to the scanning lines Yj and Yj-1.

With the above discussion in mind, we find that Takahashi teaches providing a first selecting voltage as a scanning signal in a first horizontal period to charge the liquid crystal pixels.



We also find that Takahashi teaches providing a second selecting voltage in the second half of a second horizontal period to discharge the overcharge voltage across the liquid crystal pixel cells. One of ordinary skill in the art would have duly recognized from Takahashi's teachings that the two signals are applied in two different frames for respectively charging and discharging the liquid crystal pixels. Consequently, we find error in the Examiner's stated position, which concludes that Takahashi teaches the claimed limitation of applying a first signal for charging the liquid pixels during the beginning of a frame, and a second signal for discharging the liquid crystal pixels during the ending of the same frame.

Therefore, we will not sustain the Examiner's rejection of claims 1, 4, 5, 8, 11-14 and 16 under 35 U.S.C. § 102(e).

**II. Under 35 USC 103, is the Rejection of Claims 2, 3, 6 and 7 as Being Unpatentable over the combination of Takahashi and Miwa Proper?**

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a **prima facie** case of obviousness. **In re Oetiker**, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). **See also In re Piasecki**, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in

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the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. **In re Fine**, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. **Oetiker**, 977 F.2d at 1445, 24 USPQ2d at 1444. **See also Piasecki**, 745 F.2d at 1472, 223 USPQ at 788.

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. "In reviewing the [E]xaminer's decision on appeal, the Board must necessarily weigh all of the evidence and argument." **Oetiker**, 977 F.2d at 1445, 24 USPQ2d at 1444. "[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion." **In re Lee**, 277 F.3d 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002).

With respect to dependent claims 2, 3, 6 and 7, Appellants argue at page 10 of the Appeal Brief that Takahashi does not teach that a first signal is applied to the pixels for charging

thereof during the beginning of a frame, and a second signal is applied to the pixels for discharging thereof during the ending of the frame. Appellants further argue that Miwa does not cure these deficiencies.

We agree with the Appellants that the combination of Takahashi and Miwa is not proper to render claims 2, 3, 6 and 7 obvious. As noted in the discussion above, the Takahashi reference teaches providing a first selecting voltage as a scanning signal in a first horizontal period to charge the liquid crystal pixels. The Takahashi reference also teaches providing a second selecting voltage in the second half of a second horizontal period to discharge the overcharge voltage across the liquid crystal pixel cells. The Miwa reference<sup>3</sup> is relied upon for its teaching of a ferro-electric liquid crystal and an anti-ferro-electric liquid crystal display. The combination of

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3 We observe that the Miwa reference appears to teach issuing two control signals during two terms of a single frame to thereby display an image and a blank image within the single frame. Particularly, Miwa teaches that a first control signal is provided during the first term of the frame to the data line circuits (4a and 4b), which supply an image signal to the data lines to thereby display an image. Further, Miwa teaches that a second control signal is provided during the second term of the frame to the data line circuits, which in turn supply a non image signal different from the image signal to the data lines to thereby provide a blanking non- image signal. See figure 2. See also column 3, lines 28-49.

Although the Miwa reference would seem to raise a question of patentability of representative claim 1 under 35 USC 102, we have no such rejection before us, and we therefore decline to rule on the merits of any such rejection. In any further prosecution in this application, the Examiner should consider the applicability of a 102 rejection of representative claim 1 based on the Miwa reference.

Takahashi and Miwa, as suggested by the Examiner, does not amount to the claimed limitation of applying a first signal to the pixels for charging thereof during the beginning of a frame, and applying a second signal to the pixels for discharging thereof during the ending of the frame. Despite Miwa's teachings,<sup>4</sup> Takahashi's suggestion of supplying a first signal for charging the pixels during a first frame and supplying a second signal for discharging the pixel in a subsequent frame violates the claimed limitation of charging and discharging the pixels within a single frame. This violation of the claimed limitation is not remedied by the Miwa reference, as applied by the Examiner.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have not suggested to one of ordinary skill in the art the invention as set forth in claims 2, 3, 6 and 7. Accordingly, we will not sustain the Examiner's rejection of claims 2, 3, 6 and 7 under 35 U.S.C. § 103.

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<sup>4</sup> See Id.

**III. Under 35 USC 103, is the Rejection of Claim 18 as Being Unpatentable over the combination of Takahashi and Kubota Proper?**

With respect to independent claim 18, Appellants argue at pages 10 and 11 of the Appeal Brief that Takahashi does not teach a gate driver including a plurality of gate driver circuits connected together in series, wherein a gate pulse signal, issued by the gate driver for charging the pixel element, having at least two gate pulses within a one frame interval. Appellants further argue that Kubota does not cure these deficiencies. Additionally, Appellants argue that there is no evidence of a motivation to combine Kubota's teaching of the gate driver with Takahashi's teaching to yield Appellants' claimed invention.

We note that claim 18 reads in part as follows:

" a gate driver, including a plurality of gate drive circuits connected in series, to apply a gate pulse signal to the TFT connected to the pixel element, the gate pulse signal having at least two gate pulses within a one frame interval; and a data driver to apply a video data signal to the pixel element in accordance with the gate pulse signal to charge the pixel element."

At page 9, lines 9- 29, Appellants' specification states:

As shown in Fig. 10, the gate driver 26 includes k gate drive integrated circuits GD-IC1 to GD-ICk each having a plurality of shift registers and connected in cascade. As shown in Fig. 11, the gate drive integrated circuits GD-IC1 to GD-ICk respond to a start pulse SP generated during each frame, e.g., every half period of each frame, to sequentially generate the gate pulse GP. The start pulse SP is generated at the beginning of each frame. The ON data of the video data signal Vdata is synchronized with the start pulse SP to be applied to the data lines DL1 to DLn. The first to Kth gate drive integrated circuits GD-IC1 to GD-ICk respond to the start pulse SP to sequentially generate the gate pulse GP. Thus, the start pulse SP is generated again in the middle of each frame. The OFF data of the video data signal Vdata is synchronized with the start pulse SP to be applied to the data lines DL1 to DLn. The first to Kth gate drive integrated circuits GD-IC1 to GD-ICk respond to the start pulse SP to sequentially generate the gate pulse GP. Accordingly, the liquid crystal pixel cells charge the off data at the beginning half of the frame.

Thus, the claim does require a gate driver having a plurality of gate drive circuits connected in series, wherein the gate driver issues a gate pulse signal pulse having two gate pulses within a single frame interval, and wherein the issued gate pulse is used for charging the pixel elements.

We agree with Appellants that the combination of Takahashi and Kubota is not proper to render claim 18 obvious. As noted in the discussion above, the Takahashi reference teaches providing a first selecting voltage as a scanning signal in a first horizontal period to charge the liquid crystal pixels. The Takahashi reference also teaches providing a second selecting voltage in the second half of a second horizontal period to discharge the overcharge voltage across the liquid crystal pixel cells. We note that the Kubota reference is relied upon for its teaching of a scanning line driver circuit and a signal line driver circuit being divided into a plurality of series connected unit circuits. See column 4, lines 29-32. We note, however, that the combination of Takahashi and Kubota does not teach the claimed limitation of issuing a gate pulse signal for charging the pixel elements, wherein the signal pulse signal includes two gate pulses within a single frame interval.

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It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have not suggested to one of ordinary skill in the art the invention as set forth in claim 18. Accordingly, we will not sustain the Examiner's rejection of claim 18 under 35 U.S.C. § 103.

#### **CONCLUSION**

In view of the foregoing discussion, we have not sustained the Examiner's decision rejecting claims 1, 4, 5, 8, 11-14 and 16 under 35 U.S.C. § 102. We have also not sustained the Examiner's decision rejecting claims 2, 3, 6, 7 and 18 under 35 U.S.C. § 103. Therefore, we reverse.



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No time period for taking any subsequent action in  
connection with this appeal may be extended under  
37 C.F.R. § 1.136(a)(1)(iv).

**REVERSED**

*Jerry Smith*

JERRY SMITH )  
Administrative Patent Judge )

*Howard B. Blankenship*

HOWARD B. BLANKENSHIP )  
Administrative Patent Judge )

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*Jean R. Homere*

JEAN R. HOMERE )  
Administrative Patent Judge )

JRH/ce

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BIRCH STEWART KOLASCH & BIRCH  
P.O. BOX 747  
FALLS CHURCH, VA 22040-0747